A population survey and observations on the behaviour of the blackbuck in the Point Calimere Sanctuary, Tamil Nadu[1]

S. S. Nair
Department of Zoology, University of Kerala, Kariavattom, Trivandrum
(With three text-figures)

One of the largest reported populations of the Blackbuck (*Antilope cervicapra cervicapra*) survive in the Point Calimere sanctuary in Tamil Nadu. J. C. Daniel of the Bombay Natural History Society censused this population in May 1967 and estimated 750-800 animals in the population. Considering the general rapid decline of all wild life in India, a detailed survey of the same population and a pilot investigation of the behaviour of the animal in its natural habitat were undertaken in the second half of October, 1974.

Field descriptions of the behaviour of this animal are almost totally lacking excepting Schaller's account (THE DEER AND THE TIGER, 1967) of the herd in Kanha numbering less than 20 in 1964-65 and a few other fragmentary reports.

Point Calimere (Kodikkadu) (10°18′N, 79° 51′E) is a sandy promontory on the east coast of Tamil Nadu in the Tanjore District, the protected area of which is over 4120.70 acres having a very specialized ecosystem described in detail by Daniel [*JBNHS 64*(3), 1967] and Blasco [*JBNHS 70*(2), 1973].

[1] Accepted July 1975.

Daniel found the herd strength at Point Calimere to range in between 3 and 47, the normal being a dozen. He recorded 47 herds in the sanctuary, of which six were inside the forest. In all natural populations studied, the sex ratio favoured the female.

Method of survey

The antelope are mostly found in the wide open grassy meadows dotted with thickets. They do not permit approach to nearer than about 300 yards and once put to flight may cover long distances at top speed.

Direct visual counting was done and a suitable route determined, zigzagging from one end to the other end of the sanctuary dividing the maidan into triangular plots (Fig. 1). Herds were stalked and approached with the least disturbance to the animals, and counting, sexing and classification done with the help of 7 × 50 binoculars from each of the sides of the triangular plot. Such surveys were conducted on the 19th, 22nd and 27th, and on the 27th the same route was backtracked and counting repeated to check movement of animals. Since the herds on the eastern side were

found to be very stable in both location and numbers, further repeated countings were done only on the southern part. On consecutive days in the forenoons and afternoons alternately the herds in plots 1 to 9 were counted and on the 24th, 26th and 29th, the meadows in the forest were thoroughly checked.

Though the sex of an adult could easily be distinguished, it was found more difficult in the case of yearlings, unless the spike horns were discernible in males. Similarly yearling females lying down were difficult to distinguish from adult females.

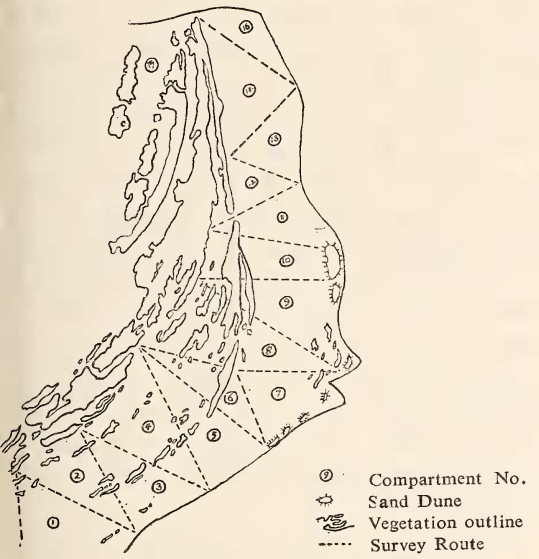

Fig. 1. Map of census plots.

During the survey 54 sightings were made of heterosexual groups, ranging in strength from 2 to 129; and 26 unisexual groups were seen, 17 of which were of males alone. Solitary animals were seen only five times of which only one was a female. Analysis of the data from the population studies shows the average strength of heterosexual herds to be 23, of female herds to be 15 and of male herds to be 4. From Table 1 it can be seen that stable herds number about 8 to 10. In the population, males including yearlings form 17.52 per cent and females 82.47 per cent i.e. the sex ratio of the population is 1♂:4.7♀. Of the males numbering 58, 12 were yearlings, 7 to 9 two-three year olds, and three were mature but pale brown in colour perhaps due to pelage moult or were permanently light coloured. The two-year old males have broadly curved horns in place of the spike horns of yearlings and are darker. Females totalled 273 of which 15 were subadults. Only 2 fawns were seen possibly because the census was just before the birth peak.

Comparison of this estimate with that of Daniel, where the sex ratio was 1:2 and one out of every 11♀ was accompanied by a fawn, shows the general trend of the population. In 1967 according to Daniel 5.81 per cent of ♂ and 26.08 per cent of ♀ were yearlings and the subadults formed 17 per cent of the total population, but in 1974 the subadults formed only 8.88 per cent, a decline by half. But the ratio of male to female yearlings does not show any great discrepancy. It is 1:1.25 compared with 1:1.5 in 1967. Of the females 7 were obviously pregnant (Table 1).

It could clearly be seen that in spite of the fact that the population is inside a sanctuary, the last six years have shown only a drastic and tragic decline of the population, especially of the magnificent bucks—truly the most beautiful of all antelopes. The very low percentage of subadults also shows an undesirable, unhealthy trend.

Herd structure, Size and Composition

Of the total of 85 animal sightings during the survey, 80 were of 2 or more animals. Herd strength varied from 2 to 129 with a mean value of 23. The large numbers of frag-

mentary herds with about 5 to 8 animals each, recorded from the disturbed plots No. 1 to 4 may possibly be a recent development. 34 out of the 54 heterosexual herds seen had one adult male and 11 had two. In herds with more than one adult male, intermale relationships are unknown. Though all older literature notes the leadership of an old female in the herd, no evidence was found substantiating it. Often when herds start running, a doe with a kid will take the lead, if there is one such present. Males wander away from herds especially in the evenings when the females become less active. Females generally do not show any tendency to follow males, but on a few occasions some females were seen following a male, which moved away from the herd. Does may have both a yearling and a fawn with them as was seen in two of the recorded instances. Of the three fawns one was suckling actively while the other two were being prevented by the mothers from suckling. (Fig. 2).

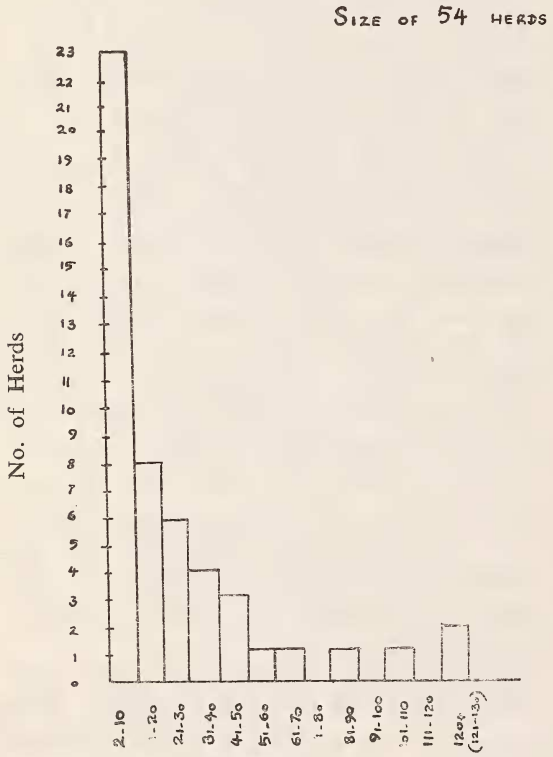

Fig. 2

Social Behaviour

Blackbuck social organization is typical of antelopes and consists of harems, normally with one male and a large number of females and young forming a herd during the reproductive season, and mixed, loose herds at other times. They have a well demarcated territory. Even though the survey was conducted in the nonrutting season, the keeping of the territorial boundaries indicates that at least the reproductive territory nucleus may be a permanent feature. This is most clearly suggested by the herds in plots 9 to 15. In the southern half of the sanctuary the territorial organization has broken down, perhaps due to large scale encroachments by villagers into plots No. 1 to 3, causing behavioural disruption, and due to pressure exerted by ousted animals on the adjacent herds. The natural reorganization prior to harem formation may be the causative factor.

The normal range of movement of herds was surprisingly small in stable territories. For example, the herd of 110 + animals in plot 10 could always be found within an area less than 500 metres across. Even in the more disturbed areas animals tend to return to the original locations soon. The conclusion of Schaller that cyclic dis-organization and re-organization of population correlated with rut, needs further study before acceptance in the case of the Point Calimere population.

TABLE 1

DISTRIBUTION PATTERN OF THE BLACKBUCK (*Antilope cervicapra*) IN POINT CALIMERE SANCTUARY

Date of survey	Plot Numbers														
Oct., 1974	1st	2nd	3rd	4th	5th	6th	7th	8th	*	10th	*	12th	*	*	15th
19th	2B♂	1B♂ 5♀	10♀	8B♂ 12♀	38♀ 13♀	2B♂ 4♀ 1f	Not Surveyed								
21st	2B♂	1B♂ 7♀	4♀ 1♂ 32♀ 5Ye♂ 1f		11♀ 6B♂ 5B♂ 2B♂ 82♀	1B♂ 1♀ 6♀	1B♂ 7♂ 1♀ 2B♂	1B♂ 1♀ 1B♂		4B♂ 105♀		1B♂ 20♀			1B♂ 19♀
22nd	2B♂	1B♂ 4♀		7Y♂ 1B♂ 1B♂ 10♀	3B♂ 41♀ 1Ye ♀	1B♂ 17♀ 1ye♂	1B♂ 1♀ 2B♂ 3♀	Not Surveyed							
23rd		1B♂ 5♀ 1B♂1y♂1♀ 1B♂ 1♀	1B♂ 8♀ 2B♂ 10♀		3B♂ 29♀			1B♂ 12♀ 1B♂ 3♀				Not Surveyed			
24th		Not Surveyed			9♀	1B♂ 40♀		Not Surveyed							
26th		Not Surveyed				3B♂ 65♀ 1Ye♂ 2B♂ 2Ye♂		Not Surveyed							
27th	2B♂ 3♀ 1ye♀	1B♂ 2♀ 5B♂ 9y♂	1B♂1♀ 4B♂	1B♂ 9♀	1B♂ 56♀ 3f 5B♂	1B♂ 26♀ 1Y♂ 5B♂ 3B♂ 1♀	1B♂ 1♀ 5B♂ 1♀ 2B♂	1B♂ 1♀ 1B♂		4B♂ 108♀ 3Ye♂ 14Ye♀		1B♂ 20♀			1B♂ 14♀
27th (Recount)	2B♂ 9♀	2B♂ 4♀	1B♂ 6♀ 1B♂ 31♀ 1Ye♂		1B♂ 46♀ 2Ye♂ 1f 1B♂ 28♀ 2ye♂		7B♂ 1B♂ 1♀	3B♂ 1Y♂		4B♂ 120♀ (U.C.)		2B♂ 2B♂ 20♀			2B♂ 20♀
29th		Not Surveyed				1B♂ 1y♂ 26♀ 2Ye♂		1B♂ 40♀ 4ye♀							

Key: B♂ = Black Male; Ye = Yearling; (u.c.) = Unclassified; Y♂ = Yellow Male; f = fawn * No animals in plots 9, 11, 13 and 14.

Territorial marking and defence

All territories have characteristic 'Scrapes' i.e. shallow depressions about 20 cm deep, 80 cm long and 30 cm wide dug by males with the hooves of the fore legs, digging 2-3 times each with first one and then the other. Into this depression the animal urinates and then defecates with characteristic body postures. Though repeated use of the same scrape was not observed, the amount of faecal pellets strewn around indicated this. 'Scraping' seems to be a territorial response. In the relatively less disturbed plots, territories have fewer scrapes, but they are numerous in others. Disturbances like intruding cattle and men, caused the male to 'scrape' and this was usually done at one end of the bunched up herd. Males usually vocalised and 'chase displayed' or 'neck thrust displayed' after marking. The frequency of this response could be as high as 3 times in 10 minutes.

No employment of the pre-orbital gland for marking was noted though Schaller cites specific instances.

Intermale fights for territorial possession may take place only at the onset of rut, no instance of which was observed. But on one occasion, alarmed by a large group of tribals, a herd fled from the sea-shore to the forest edge, a distance of more than one kilometre and into the midst of another grazing herd. There was a short bout of fighting between the two males lasting about three minutes. Once when a grazing mixed herd was approached by a group of three males the master buck walked up to the approaching males. They then turned and moved away.

The yearling males were being driven out of the herd territories by the master bucks during the period of observation. The former seem to form bachelor herds. One such herd of 7-9 males all 2-3 year old was consistently observed in plots 2 to 4, possibly due to the absence of defended territories there. They established a hierarchy as evidenced by the frequent sparring bouts. Two animals interlock their horns and push against each other. They also employ the neck butt, a quick jab at the opponent's neck with the horn base. The one that gives ground either flee, or returns for another bout. Both shake heads laterally interlocking horns, all the while flipping their tails and ears. Bouts last from a few seconds to 3 minutes. This subadult sparring seems to differ from adult agonistic behaviour where opponents stand apart and brace their legs and ram the horn bases violently together. The interlocked horns are jerked sideways. On one occasion a black male locked horns with a 2-3 year old male and pushed it back a few metres and then jabbed it in the stomach. The younger animal fled. Agonistic behaviour of this type was not observed between females. Twice jabbing of flank with the head was observed, but usually head shaking directed at another sufficed to move the latter out of the way.

Display behaviour

In mixed herds a 'chase display' was observed, where the male approaches a group of grazing females usually at one end of a dispersed herd in a characteristic prancing manner with head thrust forward and upward so that the snout points to the front and the horns are laid parallel to the neck. Ears are directed back and down showing the white inner hair. Usually, the females start moving out of the way, but one would start running ahead with the male in hot pursuit. They run in an arc back to the herd. This seems to help in keeping the herd compact, or it may be dominance assertion. Males at times butt the females lying

down while starting the run. Each such chase display lasts 15-70 seconds. Males may thrust horns into the soil and throw up loose earth while running.

A similar behaviour could be seen in herds when closely approached by human beings. A female starts running at a high speed suddenly and the male follows. They circle the herd or move away and the male appears to outflank the female while running alongside. This display is more prolonged than the former and the whole herd stands alert during this. This could easily be mistaken for sexual pursuit.

Males were noted rubbing the forehead on the ground nine times. This may be a scent marking behaviour or a display.

Vocalization:

Blackbucks are not very vocal. Though Brander records three types of vocalization by them, only one sound pattern was heard during the observation period. Males produce a deep, low pitched throaty cough or bark 'huf huf' repeated 3-6 times in 2-12 seconds.

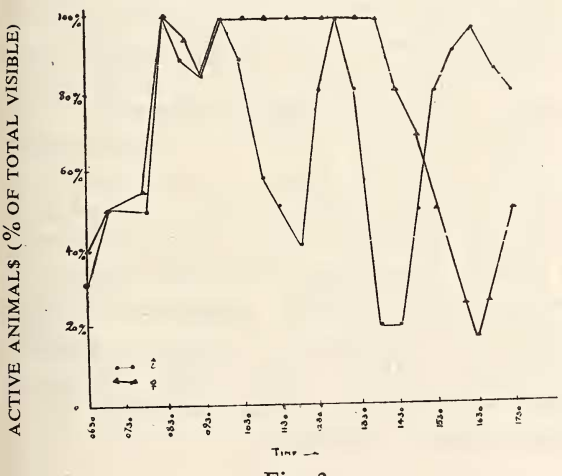

Fig. 3

ACTIVE ANIMALS AT VARIOUS TIMES OF THE DAY

This seems to have a territorial dominance assertion function.

Gait:

When feeding they move slowly but may frequently walk briskly when moving to better pastures. They may even break into a trot spontaneously. But put to flight, they run with incomparable speed and agility. The fluid motion is interrupted by a series of astounding leaps—"stotting" or "spronking". In this all the four feet are bunched together and the animal lands on the hooves simultaneously producing an audible 'thump'. This leaping may serve to increase the field of vision for a plains-dweller for whom death may lurk behind any clump of grass, or to alert conspecifics through visual, auditory or olfactory signals or may serve to deflect the aim of a pursuing enemy.

Activity pattern and rest:

The activity pattern of the antelope was recorded by noting the number of animals observed every 5 minutes to be on the move of the total visible. The observations for each 30 minute period were clumped together and expressed as per cent animals active. Data was recorded from 6.30 a.m. to 5.30 p.m. and plotted on a graph (Fig. 3). This shows some differences between the activity patterns of females and the rest of the group. Grazing picked up tempo from about 8 a.m. and reached a maximum at 9-9.30 and after a slight decrease reaches a second maximum at 10-10.30. After this in females the grazing gradually fell to a very low level by about 12 noon. But in males the activity continue uninterrupted till about 3 p.m. Females again became maximally active at about 1-1.30 p.m. There was a second period of rest around 2-2.30 and a fourth activity peak at 4-4.30. In males the activity gradually decreased from 2-2.30 p.m. to a very low level at 4.30 and

picked up a little tempo later.

This pattern may show seasonal variation and be also correlated with herd dispersion i.e. maximum dispersion just before activity drops off and minimum at rest. Males spend a good deal of their recorded active time not in grazing but in herding together the females and displaying. So possibly they graze during the night too.

Cud chewing was at the rate of 3 chews/2 seconds and females sometimes chewed the cud standing still though males were not seen to do this.

While resting, they fold the legs underneath, resting the head on the flank or stretching the neck and head on the ground. At times the legs are also stretched out.

Their drinking habits are a matter of controversy. Local people assert that they drink sea water. Two males were seen in inches deep sea water out in mud flats but they were never seen actually drinking.

Reproductive behaviour:

Rutting, according to Schaller, may take place throughout the year with two peaks —March-April and August-October. No such peak could be discerned from age distribution of young at Point Calimere. No mounting or copulation was seen, but other reproductive behaviour was observed. Males each with a single female, possibly having deserted their harems were seen in two plots repeatedly. One such male followed the female, smelled the urine she voided and displayed by 'neck thrusting' and curling the lips back ('flehmen'). This was repeated twice. According to local information calving takes place in October. If so the main rut should be in April.

Alarm response to natural predators:

The only natural predator the blackbuck has at Point Calimere is the jackal, the population of which is high. At the close approach of a jackal, resting herds get up and stand alert. In one case a herd moved out of the way and then followed a jackal pair in single file. Females lift their tails in alarm response and urinate. As many as 6 out of a 38 strong herd may urinate simultaneously when alarmed. Females were seen smelling the anogenital area of herd members with lifted tail.

Conclusion

This study was primarily aimed at surveying the population. The recorded behaviour patterns should be evaluated taking into consideration the environmental factors at the locality which may cause normal and abnormal responses in the animals. Many of the interpretations given to recorded behaviour pattern by earlier workers, including Schaller, need deeper study. The population census brings to light the steep decline in the population and behavioural disruption possibly due to disturbances caused by man. This indicates the lack of proper conservation and management of the habitat and the population of this threatened species. Unless corrective steps are taken quickly, perhaps one of the last, large blackbuck herds will also become a memory of the past. This should also be a warning against feeling complacent, trusting the Forest Departments' estimates of wildlife anywhere in India. Approximately 340 animals survive where previous estimates visualise a 1000 + population.